PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

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PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing *(day/month/year)*	03.06.2004
Applicant's or agent's file reference: I16310WO-LDH/NGJ	**IMPORTANT NOTIFICATION**

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/GB 03/00960	07.03.2003	28.03.2002

Applicant: WHEELER & CLINCH LIMITED et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.

2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.

3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the international preliminary examining authority:

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PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference I16310WO-LDH/NGJ	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/GB 03/00960	International filing date *(day/month/year)* 07.03.2003	Priority date *(day/month/year)* 28.03.2002
International Patent Classification (IPC) or both national classification and IPC H01R4/24		
Applicant WHEELER & CLINCH LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 6 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
24.10.2003	03.06.2004
Name and mailing address of the international preliminary examining authority: European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Salojärvi, K Telephone No. +31 70 340-4036

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB 03/00960

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1-3, 7-11	as originally filed
4, 5, 5a, 6	received on 09.12.2003 with letter of 08.12.2003

Claims, Numbers

1-11	received on 09.12.2003 with letter of 08.12.2003

Drawings, Sheets

1/3-3/3	received on 02.05.2003 with letter of 15.04.2003

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).

   ☐ the language of publication of the international application (under Rule 48.3(b)).

   ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   ☐ contained in the international application in written form.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority in written form.

   ☐ furnished subsequently to this Authority in computer readable form.

   ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   ☐ the description, pages:

   ☐ the claims, Nos.:

   ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-11
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-11
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-11
	No:	Claims	

2. Citations and explanations

   see separate sheet

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1 Reference is made to the following documents:

D1: US-A-6 027 361
D2: US-A-5 836 782

2 Novelty of claim 1

2.1 The document **D1** is regarded as being the closest prior art to the subject-matter of claim 1, and shows (the references in parentheses applying to this document):

A contact (10) for establishing electrical connection with an electrically conductive wire, the contact being manufactured from a planar material (see Fig. 1) and having a base (16) and a pair of elongate blades (20) extending from the base and defining therebetween a channel (30) within which a wire is to be received,
a first blade of the pair being flat,
a flat contact surface of one blade being opposite a cutting edge of the other blade and lying on opposite sids of the channel (see Fig. 6), the flat contact surface maintaining the wire substantially parallel to the flat contact surface through the channel
and the cutting edge of the other blade (the blade on the right side in Fig. 6) pointing towards the flat contact surface.

2.2 The subject-matter of claim 1 differs from this known contact blade in that: a second blade of the pair is shaped.

2.3 The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

3 Inventive step of claim 1

3.1 The above in point 2.2 mentioned difference is not rendered obvious by the

available prior art. It solves the problem of how to reliably permit insertion of a second wire in the same slot. This is achieved because the curving of the blade permits it to twist or displace tortionally, meaning that the slot width is maintained substantially constant.

3.2 The solution is thus considered as involving an inventive step (Article 33(3) PCT).

4 Claim 9

4.1 What is said above about novelty and inventive step is also applicable to the features of claim 9 that are common with claim 1.

4.2 As to the rest of claim 9, it is to be noted that, as well in the contact disclosed in the application as in the contacts disclosed in the cited documents, if a line is drawn parallel to the flat contact surface longitudinally, it actually passes through the point defined by the end of the cutting edge also longitudinally and is thus parallel to both of the surfaces defining the cutting edge (see e.f. Figures 1 and 6 in D1). This part of the claim is not clear (Article 6 PCT).

5 Claims 2-8 are dependent on claim 1 and as such also meets the requirements of the PCT with respect to novelty and inventive step.

6 Remark: claim 11 contains references to the description and the drawings. According to Rule 6.2(a) PCT, claims should not contain such references except where absolutely necessary, which is not the case here. Claim 11 is not clear (Article 6 PCT).

7 Industrial applicability

The invention relates to an electrical contact, and consequently it is obvious that the invention has industrial applicability.

There also exists in the prior art two contact designs in which the cutting blade displacement is torsional, but where no residual force is present at the contacts. These are the slotted tubular contact disclosed in US 4,591,223 (Vachhani) and the "V" contact disclosed in US 5,522,733 (White). In both of these contacts the blade displacement is torsional, but they retain the wire in the correct position without the need for the clamping elements disclosed in US 4,171,857.

However, these two contacts also have drawbacks: firstly they use more material than a planar contact, and they are more complex in manufacture, requiring part-stamping, folding or rolling operations, which are secondary stations in the manufacturing tooling. Furthermore, and by the nature of their designs, they create notches on diametrically opposing sides of the wire conductor, which can lead to premature mechanical failure at this point. This is a known weakness of these concepts.

Therefore, it is an object of the new design to provide an essentially planar contact, which may be mounted at an angle to the conductor, which does not apply residual torsional force to the wire, and which does not create notches at points which are diametrically opposite one another across the conductor.

Accordingly, one aspect of the present invention provides a contact for establishing electrical connection with an electrically conductive wire, the contact being manufactured from a planar material and having a base and a pair of elongate blades extending from the base and defining therebetween a channel within which a wire is to be received, a first blade of the pair being flat and a second blade of the pair being shaped, a flat contact surface of one blade being opposite a cutting edge of the other blade and lying on opposite sides of the channel, the flat contact surface maintaining the wire substantially parallel

to the flat contact surface through the channel and the cutting edge of the other blade pointing towards the flat contact surface.

Preferably, the second blade is shaped so as to present the flat contact surface to the cutting edge of the other blade.

Conveniently, the shaped blade prescribes an arc about an axis parallel to the longitudinal axis of the shaped blade.

Advantageously, the blades each have two major surfaces and two minor surfaces and the flat contact surface comprises a minor surface of one blade proximate the other blade.

Preferably, the blades each have two major surfaces and two minor surfaces and the flat contact surface comprises a portion of a major surface of one blade proximate the other blade.

Conveniently, the blades each have two major surfaces and two minor surfaces and the cutting edge comprises a corner of a major surface with a minor surface of the other blade proximate the one blade.

Advantageously, the flat contact surface lies in a first plane and the planes of the two surfaces defining the cutting edge lie in a second and a third plane respectively, the second and third planes being respectively between 30° and 60° to the first plane.

Preferably, the second and third planes are in the region of 45° to the first plane.

Another aspect of the present invention provides a contact for establishing electrical connection with an electrically conductive wire, the contact being

manufactured from a planar material and having a base and a pair of elongate blades extending from the base and defining therebetween a channel within which a wire is to be received, a first blade of the pair being flat and a second blade of the pair being shaped, a flat contact surface of one blade and a cutting edge of the other blade lying on opposite sides of the channel, wherein a line drawn parallel to the flat contact surface and passing through the point defined by the end of the cutting edge is not parallel to either of the surfaces defining the cutting edge.

Preferably, an insulation displacement connector includes one or more contacts embodying the present invention.

In order that the present invention may be more readily understood, embodiments thereof will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a plan view of a conventional insulation displacement connector incorporating clamping elements;

Figure 2 is a perspective view of a contact embodying the present invention;

Figure 3 is a schematic plan view of the blades only of the contact of Figure 2;

Figures 4 to 7 are schematic plan views of the blades only of further contact embodying the present invention; and

Figure 8 is a schematic plan view of one end of an insulation displacement connector fitted with contacts embodying the present invention.

CLAIMS:

1. A contact for establishing electrical connection with an electrically conductive wire, the contact being manufactured from a planar material and having a base and a pair of elongate blades extending from the base and defining therebetween a channel within which a wire is to be received, a first blade of the pair being flat and a second blade of the pair being shaped, a flat contact surface of one blade being opposite a cutting edge of the other blade and lying on opposite sides of the channel, the flat contact surface maintaining the wire substantially parallel to the flat contact surface through the channel and the cutting edge of the other blade pointing towards the flat contact surface.

2. A contact according to Claim 1, wherein the second blade is shaped so as to present the flat contact surface to the cutting edge of the other blade.

3. A contact according to Claim 2, wherein the shaped blade prescribes an arc about an axis parallel to the longitudinal axis of the shaped blade.

4. A contact according to any preceding claim, wherein the blades each have two major surfaces and two minor surfaces and the flat contact surface comprises a minor surface of one blade proximate the other blade.

5. A contact according to any one of Claims 1 to 3, wherein the blades each have two major surfaces and two minor surfaces and the flat contact surface comprises a portion of a major surface of one blade proximate the other blade.

6. A contact according to any preceding claim, wherein the blades each have two major surfaces and two minor surfaces and the cutting edge comprises a corner of a major surface with a minor surface of the other blade proximate the one blade.

7. A contact according to Claim 5, wherein the flat contact surface lies in a first plane and the planes of the two surfaces defining the cutting edge lie in a second and a third plane respectively, the second and third planes being respectively between 30° and 60° to the first plane.

8. A contact according to Claim 7, wherein the second and third planes are in the region of 45° to the first plane.

9. A contact for establishing electrical connection with an electrically conductive wire, the contact being manufactured from a planar material and having a base and a pair of elongate blades extending from the base and defining therebetween a channel within which a wire is to be received, a first blade of the pair being flat and a second blade of the pair being shaped, a flat contact surface of one blade and a cutting edge of the other blade lying on opposite sides of the channel, wherein a line drawn parallel to the flat contact surface and passing through the point defined by the end of the cutting edge is not parallel to either of the surfaces defining the cutting edge.

10. An insulation displacement connector including a contact according to any preceding claim.

11. A contact substantially as hereinbefore described with reference to and as shown in the accompanying drawings.